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Delays of Inflation Stabilizations

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Abstract:

In some new political economic models, delays of stabilizations result from coordination problems caused by collective choice-making mechanisms. Although several previous studies have tested the effects of political instability and fragmentation on seigniorage, deficits, or inflation, no direct tests of the influence of these factors on the delays of stabilizations have previously been undertaken. This paper reports the results of such tests. The degree of fragmentation of the political system and the level of inflation are identified as important determinants of the timing of inflation stabilizations.

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A. INTRODUCTION

One intriguing fact that is common to many chronic inflation countries is that they have followed potentially unsustainable policies for extended periods of time. These policies include large budget deficits that lead to rapidly growing debt to GDP ratios and hyperinflation. Although these policies are recognized as suboptimal from a social standpoint, the necessary (and welfare-improving) stabilizations are often delayed or not fully implemented. Many economists explain these suboptimal policies by accusing politicians of myopia or irrational behavior. Others argue that countries lack the expertise necessary to carry out the reforms, hope that things will get better by themselves, or wait for a larger crisis that would force them to act.

Needless to say, these explanations are not very convincing. A new political economic literature has developed formal models that try to explain the adoption of suboptimal policies by rational and forward looking agents who do the best they can in the game being played.[1] These models depart from the assumption of a social planner choosing policies according to a social welfare function, and assume, instead, that policy choices tend to be the result of negotiations between contending interest groups with conflicting interests. Then, deviations from optimality are explained by coordination problems caused by the mechanisms of making collective choices.

These models also have testable implications. Many of them focus on the influence of political factors on the timing of stabilizations: fragmentation or polarization of the political system; political instability; type of regime; political orientation of the government; and time in office. Others are related to economic factors: intensity of the crisis (level of inflation) or the amount of foreign reserves available. Although previous studies have tested the effects of political instability and

fragmentation on seigniorage, budget deficits, debt, or inflation, no direct tests of the influence of these factors on the timing of stabilizations have been undertaken.

In this paper, I employ a probit model to empirically investigate the influence of political and economic variables on the probability of starting a stabilization program. Since higher probabilities of reform in any given time interval will be associated with shorter delays in the implementation of reform after the onset of high inflation, the analysis also helps to explain the existence of delays in the adoption of stabilization plans. The empirical results of this investigation are compared with the testable implications of the theoretical models, so that we can discriminate among them.

The paper is organized as follows. Section *B* presents a description of the recent theories of delayed stabilization and reform. The empirical analysis is described in section *C*, and the conclusions of this paper are presented in section *D*.

B. DELAYED STABILIZATION

There are essentially three alternative ways of explaining delays of stabilizations or reforms. The first simply assumes myopia or irrationality of policymakers. This approach is theoretically unappealing and empirically vacuous – it offers no constructive explanation of the phenomenon. The second, based on an optimal control framework, assumes that delays are the rational and deliberate choice of a policymaker maximizing a social welfare function. In these models, delay is optimal if the costs of living under inflation are smaller than the costs of implementing a successful stabilization program. Finally, political models of conflict assume that policy choices result from negotiations between contending interest groups, and explain deviations from optimality (delays) by coordination problems caused by the mechanisms of

making collective choices. Examples of the last two types of models are discussed further below.

Although most of this literature deals with stabilization as a reduction in the budget deficit or the ratio of public debt to GDP (fiscal stabilization), their conclusions are also applicable to inflation stabilization, which is the main focus of this paper. Furthermore, in most of the countries suffering from chronic inflation, large budget deficits lead to ever-growing debt to GDP ratios and hyperinflation (through monetization), meaning that an inflation stabilization program can only succeed if it is accompanied by fiscal stabilization (see: Veiga, 1999). Thus, this literature produces several testable implications that can be applied to inflation stabilization episodes. These implications are presented below and summarized in Table 1.

<< Insert Table 1 about here >>

1) Higher fragmentation of the political system leads to delays of stabilizations

Alesina and Drazen (1991) present a model in which delays of fiscal stabilization result from the failure of rival interest groups to agree on a deficit reduction program. This stalemate leads to a "war of attrition" in which agreement on a stabilization program is only reached when one of the groups concedes, that is, accepts paying a higher proportion of the taxes in order to eliminate the deficit. In this model, one important factor leading to delays is the degree of political polarization among interest groups.

Cukierman, Edwards and Tabellini (1992) present a political model of tax reforms in which strategic considerations may induce the current government to leave an inefficient tax system to its successors (in the presence of political instability and

polarization). This will limit their availability of funds and, therefore, decrease spending on areas that are not favored by the incumbent policymaker. Thus, tax reform is delayed when the incumbent faces small probability of reelection and high polarization. Their empirical results show that after controlling for a set of structural variables countries with more unstable political systems tend to rely more on seigniorage.[2]

Since contending interest groups tend to be represented by political parties, the multitude of parties represented in the parliaments of fragmented party systems are associated with a high degree of political polarization and instability of these systems[3], which in the models discussed above would lead to greater delays of stabilizations.

2) Higher inflation hastens stabilizations

Drazen and Grilli (1993) extend the model of Alesina and Drazen (1991) emphasizing the possible benefits of economic crises. As higher costs of delay hasten stabilizations (by revealing the loser faster) an exogenous shock that aggravates the economic conditions may be welfare improving if the welfare costs of the shock are more than compensated for by the benefits of earlier stabilization. Since higher inflation results in higher costs of delaying stabilization, one should observe stabilizations starting faster as inflation gets higher (assuming no efforts by the government to reduce the costs of inflation through indexation or other means).[4]

3) Level of foreign reserves

Orphanides (1996a,b) examines delay and abandonment of a stabilization program as optimal decisions by a policymaker. He argues that it may be better to delay the program if more favorable initial conditions are expected: either the adjustment may become less painful, or political support may increase when the costs of inflation are

fully recognized by the public. An empirical implication is that a more severe inflation is likely to induce a reform effort sooner (the testable hypothesis discussed above). Further, in the Orphanides models, if a prospective reform is to be accomplished via the management of the exchange rate, the level of foreign reserves (subject to stochastic shocks) will be a critical factor. This offers the empirical prediction that low levels of foreign reserves will result in delayed or abandoned stabilization programs.

4) Stabilization comes faster in authoritarian regimes than in democracies

Haggard and Kaufman (1992) argue that the security of governments and their independence from the short-run distributive political pressures has great effects on the level and variability of inflation over the long run. Furthermore, governments in less fragmented political systems, such as authoritarian regimes, are less exposed to those political pressures and need not waste time building consensus for reform. Thus, stabilization programs should be easier to implement in authoritarian regimes.

5) Rightist governments are more prone to stabilize than leftist ones

This hypothesis is related to the partisan model of Hibbs (1977) that suggests that rightist parties care more about inflation that leftist parties do.

6) Governments are more prone to stabilize in the beginning of their terms

According to the opportunistic political business cycle of Nordhaus (1975)[5] governments tend to implement the toughest measures in the beginning of their terms, hoping short-term hardships will be largely forgotten by the time of the next election.

C. EMPIRICAL EVIDENCE

The empirical analysis consists of using a duration model to test the hypotheses related to the models discussed in the previous section. Probit and proportional hazards specifications will be estimated for a panel of 10 countries and 27 inflation stabilization programs in order to determine which variables cause delays in the adoption of stabilization plans.

1) The Data

Before estimating the probit and proportional hazards specifications, two major empirical issues had to be solved. The first was to determine when inflation was "high", that is, when a stabilization program was clearly necessary. High inflation was defined as twice the average inflation rate of the last 10 years (inflation much higher than usual) or greater than or equal to 100% (a high level by most standards). Other definitions of high inflation will be used in the sensitivity analysis. The second issue was to determine when a stabilization program had been undertaken. Since the governments that implemented most of these programs usually publicized them extensively, it is not difficult to identify their starting dates. The approach followed here was to collect information on the starting dates of all of the important stabilizations undertaken in countries suffering from chronic inflation. These major stabilizations have been previously identified in a considerable number of articles on inflation stabilization.[6]

The list of stabilization plans analyzed in this article is shown in Table 2. The second column indicates the quarter in which the plans were implemented and the third column indicates whether the stabilization was exchange rate based or money based. The last column indicates the number of consecutive quarters of high inflation that preceded the start of a stabilization plan. Those stabilizations that were implemented

when inflation was not high according to my definition have duration of high inflation of zero quarters.

<< Insert Table 2 around here >>

For each country, quarterly data was collected from the first quarter of 1957 (first quarter for which quarterly data is available) until the fourth quarter of 1996. A description of the variables used in this paper and their sources is presented in Table 3. Quarterly data are not always available for some of the countries studied, but annual data usually are. In order to make possible the inclusion of these data in the data set, straight-line interpolation was used to generate quarterly data.[7] The variables for which interpolation was used are real GDP growth and Fiscal Balance as a percentage of the GDP. Even after interpolating annual data for these variables there are still a few missing values. Observations for which there are missing values have been excluded from the probit estimations.

<< Insert Table 3 around here >>

2) Probit model

In order to determine which factors influence the timing of an inflation stabilization program, I use a binary probit model to estimate the effect of a set of political and economic variables on the probability of starting a stabilization program in a given quarter, when inflation is high. Observations in the data set include only those quarters occurring between the onset of high inflation and the adoption of a subsequent reform plan.

An individual inflation spell contains all the consecutive quarters in which inflation was high according to my definition, until a stabilization plan started or inflation ceased to be high. For each quarter and inflation spell the dependent variable (*STAB*) takes the value of one if a stabilization plan was implemented in that quarter, and zero if it was implemented after that quarter. If no stabilization is implemented, *STAB* takes the value of zero for all the observations in that inflation spell.

I start by assuming that the unobserved hazard rate, the conditional probability that a stabilization program is implemented at time *t* given that it has not been implemented before, depends only on the explanatory variables. It does not change autonomously over time and any variation must be due to the independent variables. The main explanatory variables used were the following:

- *Frag=1* and *Frag=2:* dummies for the fragmentation of the political system;[8]
- *F.Ind:* fragmentation index;
- *Ln(Inf):* log of growth in CPI since the same quarter of the previous year;
- *TR/Imp:* total foreign reserves as a percentage of imports;
- *Type:* dummy for type of regime (authoritarian or democracy);
- *Orient:* partisan (left-right) orientation of the government;[9]
- *Right:* dummy for right or center right government;
- *QLCH:* number of quarters since last change in government or election;
- *QLCH≤4:* dummy for change in government or election in the last four quarters;

I also consider two variables that were not identified directly in the theoretical discussion, but which might affect the timing of a stabilization. These variables are:

- *FB/GDP:* Fiscal Balance as a percentage of GDP;

- *GDP:* real GDP growth since same quarter of previous year.

Table 1 shows the hypotheses to which these variables are related and the expected signs of the coefficients and Table 3 presents a more complete description of the variables and respective sources. All economic variables were lagged because the start of a stabilization program could affect their contemporaneous values.

Table 4 shows the results of the probit estimations. Since probit coefficients are not very intuitive, the marginal effects of the independent variables on the dependent variable, *STAB*, are also reported. The latter give the effects of one-unit changes in the regressors on the probability of starting a stabilization program (expressed in percentage points) evaluated at the mean of the data. For dummy variables, they correspond to the effect in that probability when the dummy changes from 0 to 1. T-statistics for the null of no effect and the significance levels at which the null hypotheses are rejected are also reported.

<< Insert Table 4 about here >>

Results support my first testable hypothesis that higher fragmentation decreases the probability of starting a stabilization program (that is, leads to delays).[10] *Frag=1* and *Frag=2* are always statistically significant and the estimated coefficients have the expected signs. Furthermore, the estimated coefficient of *Frag=1* is always greater than that of *Frag*=2, as expected. This indicates that authoritarian regimes that did not allow political parties tend to stabilize faster, providing some support for the fourth hypothesis. The other measure of fragmentation, *F.Ind*[11], is used in column 5. Its coefficient has the expected sign and is marginally significant (10% significance level), providing some evidence that the proliferation of parties in the parliament leads to

delays of stabilizations. A one-unit increase in the index decreases the probability of starting a stabilization by 2.52 percentage points. In column 6, *Frag=1* and *Frag=2* were included along with *F.Ind*. Results are very similar to those of column 1 for the two dummy variables but *F.Ind* is not statistically significant and has the wrong sign. Thus, when the two measures of fragmentation are used at the same time, the dummy variables based on *Frag* seem to work better that *F.Ind*.

The first lag of the natural logarithm of inflation, *Ln(Inf(-1))*, is always statistically significant and has a positive coefficient, as expected, supporting the second testable hypothesis that stabilization comes faster as inflation gets higher.

TR/Imp(-1) has the wrong sign and is never statistically significant, providing no support for Orphanides (1996a,b) hypothesis that the decision on starting or postponing a stabilization depends upon the available level of reserves. Although the ratio of total reserves to imports may not be a perfect indicator of the amount of reserves available, it gives an idea of the capacity of one nation to keep financing its imports. Furthermore, it is one of the best proxies available that can be compared across countries of different sizes.

Type[12] has the wrong sign and is not statistically significant, which goes against the hypothesis that authoritarian regimes in general tend to stabilize faster. Thus, it seems that the hypothesis that authoritarian regimes tend to stabilize faster than democracies is not supported in general (for all authoritarian regimes). But, as mentioned above, authoritarian regimes that did not allow political parties do seem to stabilize faster, providing support for a restricted version of the hypothesis.[13]

Orient (orientation of the government) has the expected sign but is never statistically significant, providing no support for the fifth testable hypotheses that governments leaning more towards the right tend to stabilize faster. A dummy variable,

Right, that takes the value of one when *Orient* is equal to one or two (right or center right governments) was also used. Again, no support was found for the above-mentioned hypothesis.

QLCH (quarters since last change in government or election) also has the expected sign but is only marginally significant in the estimation of column 5. Therefore, I find little or no support for the hypothesis that governments tend to stabilize early in their terms. I also introduced a dummy variable that takes the value of one if a change in government or election occurred in the last 4 quarters, *QLCH≤4*, in order to test whether stabilizations tended to be implemented in the first year after assuming power. Again, no support was found for my last testable hypothesis.

As for the control variables, *FB/GDP(-1)* has the expected sign but is only marginally significant in four of the six estimations. *GDP(-1)* also has the expected sign and is always statistically significant at the 5% level.

It should be noted that the estimations of Table 4, as well as those of Tables 5,6 and 7, do not include country dummies because no evidence of country fixed effects was found when these were accounted for. The country dummies were never statistically significant individually or jointly, and nothing substantive changes when they are included.[14]

Table 5 presents the results of a sensitivity analysis in which several variants of the model of column 2 of Table 4 are estimated. First, alternative definitions of high inflation were used: over twice the average inflation rate of the last five years or greater than 100% (column 1); or, simply, above 50% (column 2) or 100% (columns 3 and 4). Second, Israel and Turkey were excluded from the sample, so that one could verify if conclusions held when only Latin American countries were included (column 5). Third, Mexico and the Dominican Republic were excluded, so that only South American

countries would remain (column 6). And, fourth, all observations before 1970 were excluded (column 7). Since most of the problems with chronic inflation started or became more severe in the 1970s, leading to the implementation of stabilization programs in several countries, I check whether results are affected by not considering the earlier stabilizations.

<< Insert Table 5 around here >>

Results for most of the tested hypothesis changed little. Although *Frag=1* is not statistically significant in column 3 (Inf≥100%), it is shown in column 4 that higher fragmentation still increases delays: the new dummy variable, *Frag≤2*, that takes the value of one when *Frag* is equal to 1 or 2, is highly significant. Inflation remains highly significant in most estimations, providing support for the hypothesis that higher inflation hastens stabilizations. The major difference is that the evidence for the hypothesis that stabilizations come faster in authoritarian regimes is reduced: the coefficient on *Frag=1* is not significant in the third column and it is smaller than the one associated with *Frag=2* in columns 1 and 7.

Table 6 shows the results when only Exchange Rate Based Stabilizations are considered. First, Orphanides (1996a,b) models are tested using three different proxies for the availability of reserves: total reserves as a percentage of imports (column 1), change in total reserves since the same quarter of the previous year (column 2), and percentage deviation from trend[15] of total reserves (column 3). None of these variables is statistically significant. Second, the influence of IMF credit is taken into account by looking at quarterly data of Total Fund Credit and Loans Outstanding (*TFC*) and at the occurrence of IMF arrangements with the countries included in the sample. Columns 4

and 5 show that the lag of the level and of the change in Total Fund Credit do not affect the probability of starting a stabilization (results are the same for other lags and moving averages of *TFC*). Concluding an arrangement with the IMF in the year of the observation does not have a significant effect either (column 6). The same applies for IMF arrangements in previous years.

<< Insert Table 6 around here >>

These results seem to indicate that the availability of foreign exchange reserves and IMF credit or arrangements are not important for the decision to start a stabilization program. Nevertheless, we should not completely discard that possibility. First, the expected level of reserves, on which we have no data, may be more important than the actual level of reserves. Second, Casella and Eichengreen (1996) argue that both the timing of the decision to provide aid and of the actual transfer of funds matter. Since the only information we have is the year in which an arrangement was agreed upon, we cannot appropriately test whether the actual provision of foreign aid affects the timing of stabilization programs.

I also performed a considerable number of robustness tests and sensitivity analyses not reported here.[16] First, quarterly growth in CPI was used instead of growth in CPI since the same quarter of the previous year. Second, growth in money since the same quarter of the previous year was used instead of growth in the CPI. Third, current account balance as a percentage of GDP, growth in exports, and growth in imports were added to the list of explanatory variables, either one at a time or all at the same time. Fourth, because results could be sensitive to interpolation methods, I reestimated the model using only observations for which quarterly data was available, or using only

annual data. Finally, as any definition of high inflation is necessarily arbitrary, I also estimated the results using all observations available or all non-stabilization quarters (those in which a stabilization was not already under way), instead of using just the high inflation quarters. The conclusions of the analysis are unchanged in these alternative estimations.

3) Probit with time dummies

In the estimations described above I assumed that the probability of starting a stabilization plan in a given quarter did not change autonomously over time, meaning that any variation had to be due to changes in the explanatory variables. A simple way to allow that probability to change over time, even when the independent variables are held constant, is to create a set of dummy variables accounting for the passage of time and include them in the probit model.[17] Since the duration of high inflation before a stabilization was never longer than seven years (the longest one was of 27 quarters), seven year dummies reflecting the duration of high inflation before stabilization were created and six were included in the list of independent variables.[18]

Results are shown in columns 1 to 3 of Table 7, which should be compared with columns 1 to 3 of Table 4. *Frag=1* and *Frag=2* are now highly significant and their estimated coefficients are larger than before. *Ln(Inf(-1))* remains significant, but at a lower level. *Orient*, *Right, QLCH*, *QLCH≤4,* and *TR/Imp(-1)* are not significant. *FB/GDP(-1)* is always significant at the 5% level and *GDP(-1)* is only marginally significant. Finally, the time dummies for the first and third years are always significant, meaning that the passage of time does affect the hazard rate. In short, the introduction of year dummies in the regressions reinforced the support for the hypothesis that higher fragmentation reduces the probability of starting a stabilization program (increases

delays) and did not change considerably the support found for the other testable hypotheses.

<< Insert Table 7 around here >>

4) Proportional hazards model[19]

Although the life of a stabilization plan is a continuous-time process, available data is discrete, meaning that the best that can be done is to work with data grouped into time intervals. For the countries involved, the smallest time interval for which it was possible to gather data for most of the variables used was one quarter. Then, the strategy followed was to assume an underlying continuous-time model and estimate its parameters by methods that take into account the discrete character of the data. Our first approach was to estimate a probit model.

While a probit model has the advantage of being easily estimated by most of the statistical software packages available, it might not be the most correct model to apply in the present case. Estimated coefficients are not necessarily the discrete-time equivalent of the underlying continuous-time model and the coefficient vector is not invariant to the length of the time intervals, meaning that the choice of the time interval (quarters in the present case) may affect estimated coefficients.

Prentice and Gloeckler (1978) developed a grouped data (discrete-time) version of the proportional hazards model that does not suffer from the problems of the probit model noted above. This model is expressed as follows:

$$P_{it} = 1 - \exp\left[-\exp\left(\alpha_t + \beta' x_{it}\right)\right], \qquad \textbf{(1)}$$

where P_{it} is the probability that plan i is implemented at time t, α_t is an unspecified function of time, x_{it} is a vector of time-dependent variables (covariates), and β is a vector of parameters which is unknown. In this model, the discrete-time estimated coefficients are also estimates of the underlying continuous-time model and the coefficient vector is invariant to the length of the time interval. Thus, the two problems of the probit model referred to above are avoided by the proportional hazards specification.

Using the proportional hazards model, I have re-estimated the regressions of columns 1 to 3 of Table 4. Results, shown in columns 4 to 6 of Table 7, are very similar to those of the probit model. Therefore, the conclusions regarding the support for the testable hypotheses remain the same.

D. CONCLUSIONS

The empirical results of this article show that some political variables are important determinants of the timing of stabilizations. Probit and proportional hazards estimations over a panel of 10 countries and 27 stabilization attempts clearly support the hypothesis that higher fragmentation of the political system generally leads to delays of stabilizations. Since higher fragmentation of the political system tends to lead to higher polarization and political instability, these results are consistent with the "war of attrition" model of Alesina and Drazen (1991) and with the findings of Cukierman, Edwards, and Tabellini (1992) regarding the effect of political instability on inflation.

Higher inflation seems to hasten stabilizations, as suggested by the "benefits of crises" model of Drazen and Grilli (1993) and by the distributional conflict and optimal control models. There is also some support for the hypothesis that authoritarian regimes hasten stabilizations, but evidence is found only for those cases in which political

parties are not allowed. Little or no evidence was found of opportunistic business cycles or partisan effects.

Finally, empirical results do not seem to support the hypothesis of Orphanides (1996a,b) that the decision of starting or delaying a stabilization program is essentially based on the available amount of foreign reserves. Nevertheless, we cannot completely discard that hypotheses because expected reserves, for which there is no data, may be a more important variable than actual reserves.

In sum, it seems that the structure of the political system may help explain why suboptimal (inflationary) policies are kept for long periods of time and the necessary corrective actions are not taken. Countries whose electoral systems are highly proportional tend to have a higher number of parties represented in parliament, generally leading to higher political polarization and instability. Then, conflicts of interests between political parties make the approval of new legislation harder and stabilization programs are often delayed until a serious crisis sets in.

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[1] For surveys on this literature, see: Alesina (1994), Drazen (1996), Rodrik (1993), and Rodrik (1996).

[2] Alesina and Tabellini (1989) present a model along the same lines. Similar evidence regarding the effects of political instability is found by Edwards and Tabellini (1991), and Roubini (1991).

[3] Mainwaring and Scully (1995, pp. 28-33) argue that the most polarized political systems in Latin America are also the most fragmented. Roubini and Sachs (1989) showed for industrial countries that the degree of fragmentation of the political system is directly related to the public debt, given the difficulty of parties to agree on fiscal stabilization in more fragmented party systems. Here, I will test the related hypothesis that higher fragmentation leads to greater delays of inflation stabilization programs.

[4] This hypothesis is also consistent with the optimal control models of Orphanides (1996a,b) and with the class conflict models of Laban and Sturzenegger (1994a,b) and Mondino, et al. (1996), that stress the importance of capital flight in the process of increasing inflation. We should note that at very high levels of inflation, currency substitution might be even more important. As Bernholz (1995) points out, the public tends to restrict its use of the inflating money during hyperinflations or advanced inflations. As they substitute the national currency by the foreign one(s), the real stock of money shrinks, decreasing the base for the inflation tax. High inflation will also decrease the revenue from normal taxes because of the time lags between the assessment, payment and expenditure of tax revenues (Olivera-Tanzi effect). In such a situation, a stabilization is the last effort of the government to prevent losing its tax power completely. Since currency substitution is usually illegal, it is impossible for me to get data on it for all the countries studied and evaluate its effect on the timing of stabilizations. See Bernholz (1996) for an empirical study for which data on currency substitution was available - the Soviet hyperinflation of 1922-1924.

[5] On political business cycle and partisan theories, see: Alesina (1994).

[6] See Bruno, et al. (1988), Bruno, et al. (1991), Calvo and Végh (1994), Kiguel and Leviatan (1992), Pastor (1992), Hoffmaister and Végh (1996), and Végh (1992).

[7] For some countries, only annual data is available on some variables and, sometimes, there is no data at all for earlier decades. I used straight-line interpolation to generate quarterly data and I also interpolated the series assuming that these were AR1 (auto-regressive or order 1) or RW1 (random walk of order 1). Although these interpolation techniques may not be the most correct ones, especially for GDP, results were not driven by the way annual data was interpolated. Results using straight-line interpolation or the other interpolation techniques are very similar to those obtained when one works only with the available quarterly data or when annual data is used instead of quarterly data. An appendix containing some of these results is available from the author upon request.

[8] Three dummy variables based on *Frag* were created: *Frag=1*, *Frag=2*, and *Frag>2*. The 4 degrees of fragmentation used by Roubini and Sachs (1989) would correspond to the values 2 to 5 of *Frag*. To account for dictatorships, one more degree of fragmentation was considered ("1- No parties allowed or exclusive one-party systems"). Since there were no stabilizations being implemented when *Frag* was equal to 4 or 5, it was not possible to create dummy variables for these cases and include them in the set of regressors, because they would totally predict the value of the dependent variable (*STAB=0*). Thus, only three dummies were created and the first two were included in the set of explanatory variables.

[9] According to the partisan business cycle of Hibbs (1977), leftist governments are more prone to inflation than rightist governments. The classification used for this variable follows Haggard and Kaufman (1992).

[10] The fact that 3 out of 4 stabilization programs implemented when inflation was not high according to my definition (Argentina, 1967.2; Chile, 1978.1; and Uruguay, 1978.4) resulted from decisions of authoritarian regimes that did not allow political parties also seems to support the hypothesis that higher fragmentation increases delays. Furthermore, in the fourth case, Mexico 1987.4, there was a dominant party in power, the PRI, that always got an overall majority in the Mexican Parliament (actually, Mexico was most of the time the least fragmented of the democratic regimes).

[11] *F.Ind* is the Laakso and Taegepera (1979) measure of the effective number of parties in Parliament with parties being weighted according to their size. The greater the index, the greater are the effective number of parties and fragmentation. According to Maiwaring and Scully (1995, p. 31) polarization or

the "ideological distance tends to widen as the effective number of parties increases."

[12] This variable was not included in the estimations of columns 1 to 4 because when *Frag=1* takes the value of one *Type* is also equal to one, resulting in high correlation of these variables, 66.89%, which could lead to problems of multicolinearity.

[13] One direct way of testing whether "strong" dictators tend to stabilize faster than "weak" dictators or not would be to create a dummy variable representing the latter and include it in the estimation of column one, so that its coefficient could be compared to that of *Frag=1*. Unfortunately, that is not possible because in this sample there is not a single case in which a "weak" dictator implements an inflation stabilization program. Thus, a dummy variable representing "weak" dictators would totally predict the value of the dependent variable (*STAB=0*).

[14] An Appendix containing these results is available from the author upon request.

[15] The deviations from trend were obtained using the Hodrick-Prescott decomposition method.

[16] An Appendix with these results is available from the author upon request.

[17] See Allison (1982) for an example with a Logit model. He also compares the results of two Logit models, with one assuming that the hazard rate does not change autonomously over time, and the other relaxing that constraint by adding year dummies to the list of regressors.

[18] Since the data set is composed of quarterly data, the inclusion of quarterly dummies reflecting the duration of high inflation before stabilization would be ideal, but that was not possible because for many quarters there were no stabilizations being implemented. This means that the dummies for these quarters would completely predict the value of the dependent variable (*STAB=0*). Thus, I decided to create yearly dummies instead. Since the longest period of high inflation was of 27 quarters, corresponding to almost 7 years, only seven dummies were created (6 for the first six years of high inflation before a stabilization, and a 7^{th} for all the remaining years). The creation of additional year dummies was not possible because these would totally predict the value of the dependent variable.

[19] For a description of the proportional hazards model, see: Prentice and Gloeckler (1978), Allison (1982), and Jenkins (1995).

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Table 1: Hypotheses related to the literature presented

Hypotheses tested and related literature	Variables used	Expected signs of coefficients
***1 – Higher fragmentation of the political system leads to delays of stabilizations*:**	Frag = 1	+
Alesina and Drazen (1991), Alesina and Tabellini (1989), Cukierman, Edwards, and Tabellini (1992), and Roubini and Sachs (1989).	Frag = 2	+
	F.Ind	-
2 – Higher inflation hastens stabilizations:		
Alesina and Drazen (1991), Drazen and Grilli (1993), Laban and Sturzenegger (1994a,b), Mondino et al. (1996), and Orphanides (1996a,b).	Ln(Inf)	+
3 – Greater amount of reserves hastens stabilizations:	TR/Imp	+
Optimal control models of Orphanides (1996a,b)	TRgr	+
	TrdevT	+
4 – Stabilizations come faster in authoritarian regimes than in democracies:	Frag = 1	+ Frag=1 > Frag=2
Haggard and Kaufman (1992)	Type	+
5 – Rightist governments are more prone to stabilize than leftist ones:	Orient	-
	Right	+
Partisan model of Hibbs (1977)		
6 – Governments are more prone to stabilize in the beginning of their terms than towards the end:	QLCH	-
	QLCH ≤ 4	+
Political business cycle model of Nordhaus (1975)		

Notes:

- See Table 3 for a description of the variables used;
- When "*Frag=1 > Frag=2*" is indicated along with the expected sign of a coefficient, it means that it is also necessary that the estimated coefficient associated with *Frag=1* is greater than the one associated with *Frag=2* to support the tested hypothesis.

Table 2: Stabilization Programs

Country	Program dates / names	Type	Duration of "high" inflation until stabilization (quarters)
Argentina	1959.3	ERBS	4
	1967.2	ERBS	0
	1973.3	ERBS	6
	1978.4 (Tablita)	ERBS	15
	1985.1(Austral)	ERBS	14
	1990.1 (Bonex)	MBS	11
	1991.2 (Convertibility)	ERBS	1
Bolivia	1985.4	ERBS	14
Brazil	1964:2	ERBS	4
	1986:1 (Cruzado)	ERBS	22
	1990.2 (Collor)	MBS	13
	1994.3 (Real)	ERBS	14
Chile	1975.2	MBS	11
	1978.1 (Tablita)	ERBS	0
Dominican Republic	1985.2	ERBS	4
	1991.2	MBS	13
Israel	1985.3 (Shekel)	ERBS	27
Mexico	1976.4	ERBS	0
	1988.1	ERBS	5
Peru	1981.3	ERBS	22
	1985.4	ERBS	10
	1990.3	MBS	11
Turkey	1980.1	ERBS	12
Uruguay	1960.4	MBS	7
	1968.2	ERBS	11
	1978.4 (Tablita)	ERBS	0
	1991.3	MBS	5

Sources: Bruno, et al. (1988), Bruno, et al. (1991), Calvo and Végh (1994), Kiguel and Leviatan (1992), Pastor (1992), Hoffmaister and Végh (1996), and Végh (1992).

Notes: ERBS = Exchange Rate Based Stabilization (20 in this sample);
MBS = Money Based Stabilization (7 in this sample).

Table 3: Description of the Variables Used and Respective Sources

Political variables:

Frag - Degree of fragmentation of the political system:

1 no parties allowed or exclusive one-party systems;
2 one-party majority parliamentary government; or presidential government, with the same party in control of the parliament (with an overall majority);
>2 More fragmented political systems.

F.Ind - Fragmentation Index of the distribution of seats in the lower house of the parliament:

$$F.Ind = \frac{1}{\sum p_i^2}$$, where p_i = percentage of seats of party *i*.

Type - Type of political system:

1 = m military dictatorship or authoritarian government backed by the military;
0 = d democracy.

Orient - Political orientation of the government:

1 conservative, antilabor or antileft government;
2 center-right government or coalition of center-right and center-left parties;
3 center-left government;
4 socialist or populist government.

Right – Right, center right, or coalition of center-right and center-left parties government:

1 (Orient=1 or Orient=2);
0 (Orient=3 or Orient=4).

QLCH - Quarters since last change in government or election

Economic variables:

Ln(Inf) – Natural log of Growth of CPI since the same quarter of the previous year

TR/Imp - Total Reserves as a Percentage of Imports

TRgr – Growth in Total Reserves since the same quarter of the previous year

TrdevT – Percentage deviation from Trend (Hodrick-Prescott) of Total Reserves

IMFProgram = 1 if there was an IMF arrangement in the same year, and zero otherwise

TFC - Total IMF credit and loans outstanding

FB/GDP - Fiscal Balance (Government Budget Balance) as a Percentage of GDP

GDP - Growth of Real GDP since the same quarter of the previous year

Sources:

- Political variables: Banks A. ed., *Political Handbook of the World*, several issues; Dornbusch and Edwards (1991); Gorvin (1989); Haggard and Kaufman (1992); McDonald and Ruhl (1989); Mainwaring and Scully (1995);*World Europa Yearbook*, several issues. For tables containing the data on the political variables see: Veiga (1998).
- Economic variables: *International Financial Statistics* - IMF. Quarterly data on Real GDP was also obtained from IBGE (Brazil), INEGI (Mexico), and Végh (1992), for Chile (1977:1 to 1979:4) and Uruguay (1978:1 to 1983:4). Data on *IMFProgram* is based on Table 3 of Knight and Santaella (1997), for the period 1973-91, and on information available in the IMF web page for the following years (1992-96).

Table 4: Probability of Starting a Stabilization Program

	1	2	3	4	5	6
Frag = 1	.842 (2.36)** [14.5]	.895 (2.70)*** [15.8]	.952 (2.89)*** [17.5]	.890 (2.69)*** [15.7]		1.130 (2.18)** [22.3]
Frag = 2	.805 (2.88)*** [11.4]	.810 (2.90)*** [11.5]	.858 (3.11)*** [12.6]	.806 (2.88)*** [11.4]		.919 (2.89)*** [13.5]
F.Ind					-.181 (-1.87)* [-2.52]	.081 (.78) [1.08]
Ln(Inf) (-1)	.309 (3.07)*** [4.12]	.314 (3.12)*** [4.19]	.327 (3.29)*** [4.40]	.314 (3.12)*** [4.20]	.303 (2.84)*** [4.22]	.274 (2.48)** [3.65]
TR/Imp (-1)	-.029 (-.27) [-.387]	-.029 (-.280) [-.391]	-.040 (-.38) [-.539]	-.029 (-.28) [-.396]	-.009 (-.09) [-.130]	-.036 (-.34) [-.487]
Type					-.571 (-1.44) [-5.52]	
Orient	-.056 (-.40) [-.75]				-.216 (-1.47) [-3.02]	-.047 (-.33) [-.627]
Right		.022 (.84) [.244]	.034 (.13) [.379]	.025 (.09) [.273]		
QLCH	-.028 (-1.30) [-.386]	-.030 (-1.35) [-.400]		-.036 (-1.10) [-.493]	-.040 (-1.90)* [-.558]	-.026 (-1.18) [-.354]
QLCH ≤ 4			.201 (.85) [2.33]	-.098 (-.28) [-1.04]		
FB/GDP (-1)	.044 (1.64)* [.597]	.046 (1.68)* [.620]	.050 (1.82)* [.681]	.044 (1.59) [.597]	.047 (1.84)* [.664]	.042 (1.55) [.564]
GDP (-1)	.060 (2.25)** [.807]	.059 (2.24)** [.793]	.058 (2.24)** [.779]	.059 (2.23)** [.792]	.060 (2.31)** [.849]	.057 (2.08)** [.760]
Log Likelihood	-76.43	-76.51	-77.13	-76.47	-79.66	-76.12
McFadden R^2	.1655	.1646	.1579	.1650	.1302	.1689
Observations	309	309	309	309	309	309
Schwarz B.I.C.	-99.36	-99.44	-100.06	-102.27	-102.59	-101.92

Sources: see Table 3.

Notes: - t-statistics are in parentheses;
- the marginal effects of the independent variables on the probability of starting a stabilization are in brackets;
- significance level at which the null hypothesis is rejected: ***, 1%; **, 5%, and *, 10%;
- models estimated with a constant, by Maximum Likelihood (ML).

Table 5: Sensitivity Analysis

	Alternative definitions of high inflation				Restricted samples		
	Inf≥100% or Inf ≥ 2MA of last 5 years	**Inf ≥50%**	**Inf ≥ 100%**		**Latin America**	**South America**	**1970:1 to 1996:4**
	1	**2**	**3**	**4**	**5**	**6**	**7**
Frag = 1	.817 (2.49)**	.768 (2.05)**	.603 (1.35)		.785 (2.15)**	.889 (2.12)**	.730 (2.06)**
Frag = 2	.862 (3.05)***	.728 (2.43)**	1.051 (2.98)***		.774 (2.56)**	.741 (2.01)**	.806 (2.74)***
Frag ≤ 2				.912 (2.76)***			
Ln(Inf) (-1)	.306 (3.02)***	.333 (3.01)***	.285 (2.16)**	.298 (2.29)**	.284 (2.69)***	.335 (2.78)***	.321 (3.09)***
TR/Imp (-1)	-.020 (-.18)	-.027 (-.25)	.015 (.12)	.023 (.19)	-.004 (-.04)	-.034 (-.29)	-.014 (-.12)
Right	.100 (.37)	.008 (.02)	.010 (.02)	-.086 (-.24)	.002 (.008)	-.019 (-.05)	-.035 (-.12)
QLCH	-.028 (-1.27)	-.030 (-1.28)	-.036 (-1.28)	-.032 (-1.16)	-.026 (-1.19)	-.040 (-1.37)	-.034 (-1.43)
FB/GDP (-1)	.046 (1.68)*	.038 (1.36)	.033 (1.06)	.033 (1.06)	.044 (1.50)	.053 (1.39)	.049 (1.70)*
GDP (-1)	.059 (2.21)**	.050 (1.83)*	.062 (1.74)*	.063 (1.81)*	.050 (1.88)*	.062 (2.06)**	.063 (2.15)**
Log Likelihood	-61.53	-62.43	-45.76	-46.32	-71.64	-57.86	-62.99
McFadden R^2	.1603	.1677	.1967	.1867	.1337	.1696	.1809
Observations	290	256	187	187	264	224	278
Stabilizations	27	22	17	17	25	21	22

Sources: see Table 3.

Notes: - t-statistics are in parentheses;
- significance level at which the null hypothesis is rejected: ***, 1%; **, 5%, and *, 10%;
- models estimated with a constant, by Maximum Likelihood (ML).

Table 6: Results when only Exchange Rate Based Stabilizations are considered

	1	2	3	4	5	6
Frag = 1	1.250 (3.11)***	1.197 (3.00)***	1.216 (3.10)***	1.20 (3.09)***	1.182 (3.06)***	1.224 (2.68)***
Frag = 2	1.004 (2.95)***	.973 (2.93)***	.971 (2.91)***	.961 (2.90)***	.954 (2.88)***	1.056 (2.94)***
Ln(Inf) (-1)	.201 (1.76)*	.256 (2.42)**	.252 (2.38)**	.243 (2.22)**	.246 (2.30)**	.292 (2.55)**
TR/Imp (-1)	.170 (1.52)					
TRgr (-1)		-.00008 (-.09)				
TRdevT (-1)			.002 (.98)			
TFC (-1)				.00005 (.44)		
ΔTFC(-1)					-.0001 (-.41)	
IMFProgram						-.530 (-1.48)
Right	-.266 (-.90)	-.203 (-.71)	-.215 (-.75)	-.190 (-.65)	-.194 (-.67)	-.268 (-.83)
QLCH	-.026 (-1.09)	-.095 (-.83)	-.021 (-.90)	-.022 (-.91)	-.020 (-.84)	-.020 (-.78)
FB/GDP (-1)	.015 (.52)	.038 (.80)	.022 (.75)	.026 (.86)	.022 (.76)	.032 (1.02)
GDP (-1)	.069 (2.25)**	.070 (2.32)**	.072 (2.35)**	.068 (2.26)**	.069 (2.32)**	.075 (2.16)**
Log Likelihood	-61.53	-62.66	-62.22	-62.60	-62.60	-49.72
McFadden R^2	.1694	.1534	.1601	.1550	.1550	.1852
# Observations	309	308	309	309	309	275
# Stabilizations	20	20	20	20	20	16

Sources: see Table 3.

Notes:

- t-statistics are in parentheses;
- significance level at which the null hypothesis is rejected: ***, 1%; **, 5%, and *, 10%;
- models estimated with a constant, by Maximum Likelihood (ML);

Table 7: Probit with year dummies and Proportional Hazards

	Probit with year dummies			Proportional Hazards		
	1	**2**	**3**	**4**	**5**	**6**
Frag = 1	1.307 (3.04)***	1.331 (3.30)***	1.379 (3.48)***	2.159 (3.05)***	2.239 (3.16)***	2.343 (3.34)***
Frag = 2	1.221 (3.45)***	1.236 (3.46)***	1.277 (3.64)***	2.022 (3.02)***	2.093 (3.01)***	2.199 (3.16)***
Ln(Inf) (-1)	.275 (2.14)**	.285 (2.19)**	.298 (2.34)**	.528 (2.44)**	.559 (2.45)**	.587 (2.46)**
TR/Imp (-1)	-.117 (-.95)	-.117 (-.95)	-.124 (-1.01)	-.338 (-1.16)	-.337 (-1.14)	-.350 (-1.11)
Orient	.025 (.16)			.079 (.21)		
Right		-.141 (-.48)	-.143 (-.49)		-.397 (-.59)	-.372 (-.56)
QLCH	-.015 (-.63)	-.015 (-.63)		-.028 (-.52)	-.029 (-.56)	
QLCH ≤ 4			.093 (.35)			.081 (.15)
FB/GDP (-1)	.061 (1.98)**	.064 (2.03)**	.067 (2.10)**	.107 (1.57)	.117 (1.64)*	.118 (1.67)*
GDP (-1)	.053 (1.72)*	.052 (1.68)*	.051 (1.67)*	.070 (1.22)	.066 (1.15)	.064 (1.13)
1st year	-1.46 (-1.81)*	-1.53 (-1.86)*	-1.58 (-1.89)*	-2.49 (-1.85)*	-2.70 (-1.92)*	-2.83 (-1.86)*
2nd year	-1.22 (-1.53)	-1.30 (-1.59)	-1.36 (-1.66)*	-2.30 (-1.73)*	-2.55 (-1.75)*	-2.70 (-1.73)*
3rd year	-1.71 (-2.04)**	-1.79 (-2.09)**	-1.86 (-2.16)**	-3.22 (-2.30)**	-3.46 (-2.32)**	-3.62 (-2.36)**
4th year	-.199 (-.26)	-.266 (-.34)	-.306 (-.39)	-.532 (-.45)	-.732 (-.58)	-.852 (-.66)
5th year	-.739 (-.76)	-.794 (-.81)	-.859 (-.89)	-1.20 (-.80)	-1.33 (-.89)	-1.44 (-.98)
6th year	-.488 (-.57)	-.539 (-.62)	-.552 (-.64)	-.931 (-.61)	-1.03 (-.69)	-1.11 (-.73)
Log Likelihood	-68.43	-68.33	-68.47	-68.30	-68.09	-68.28
McFadden R^2	.2528	.2539	.2523	.1863	.1889	.1867
Observations	309	309	309	309	309	309
Schwarz Bayesian. Information Criterion	-114.30	-114.20	-114.34	-114.17	-113.96	-114.15

Sources: see Table 3.

Notes: - t-statistics are in parentheses;
- significance level at which the null hypothesis is rejected: ***, 1%; **, 5%, and *, 10%;
- models estimated with a constant and six year dummies, by Maximum Likelihood (ML).